

The Presido
Radio Project



JOURNAL OF THE
CALIFORNIA HISTORICAL
RADIO SOCIETY

CHRS OFFICERS AND STAFF 1996

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The California Historical Radio Society (CHRS) is a non-profit coporation chartered in the State of California. CHRS was formed in 1974 to promote the restoration and preservation of early radio and broadcasting. Our goal is to provide the opportunity to exchange ideas and information on the history of radio, particularly in the West, with emphasis in collecting, literature, programs, and the restoration and display of early equipment.

The *Journal* of the Society is published and furnished free of charge to members. Yearly membership dues are \$20 (U.S. funds).

Submissions for the *Journal* are always welcome. Typed copy is prefered, submitted on a 3.5 inch IBM or Macintosh diskettes in ASCII or Microsoft Word format. Send all material to Alan Voorhees and include your name, address, and phone number. You write about radio and we'll print it.

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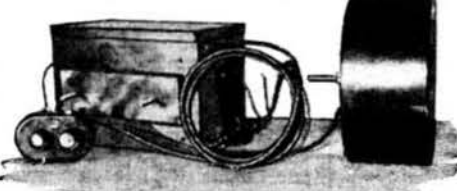
CHRS on the Internet:
<http://www.wp.com/chrs>

ON THE COVER

AN/GRC-9 "Angry-Nine" Transceiver.

Inset photos (top to bottom):

The Coast Artillery Radio Station, Building 1444,
The Presidio, San Francisco;
Don Kojane, President, Perham Foundation and
Joseph Chow, AIA, CHRS Architect;
Steve Kushman, George Flores, Russ Turner, Bart
Lee, Edith Durfey;
Paul Thekan and Cub Scout;
Perham Directors Kip Crosby, Edwin Elkrah, Dan
Ramsey, and Acquisitions Chairman, George
Flores.

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NEWS AND INFORMATION...FROM THE PRESIDENT

Steve Kushman

NEWS:

April 19th—Was a busy day for CHRS. Not only were we clearing brush and weeds from around Building 1444 in the Presidio to celebrate Earth Day (Please see **Bart Lee's** article for more details). We also had an exhibit of 1940's vintage radios at the Legacy Celebration at the Alameda Naval Air Station! Our thanks to **Paul Bourbin** and his son **Mark, Lee Alder, Robert** and **Reina Swart** for setting up and manning the exhibit, and for providing some fine radios, test gear and period literature. Also a big thank you to **Stan** and **Diane Lichtenstein** for suggesting and co-ordinating the exhibit. The battery sets played, the public listened and asked lots of questions about the old radios. Exhibits of radios are a way to educate the public about preserving this technology. If you know of an event that would support this kind of exhibit and would like to organize it, please call the **HOTLINE**.

Position Filled—If you find yourself in front of a camera at our events, **Dale Tucker** is probably behind it! We welcome and thank **Dale** for documenting our activities, as our club photographer. Also a new member, recently arrived from England, **Peter Giles**, has volunteered to shoot pictures when **Dale** is not available. Thanks men! We are still looking for a Coffee Commissioner. We have the urn. Who can brew?

Dues—If you know someone who hasn't paid their 1997 dues tell them to remit now, Please! Remember, if you try to sell at one of our events and your dues aren't current, it will cost you \$25.

Hotline—Please call the CHRS **HOTLINE**, 415 821-9800 for the latest and best information or any changes involving our events.

On the Web—Our web site continues to be very popular! Its snappy graphics and valuable information make it a must visit site. Also the number of radio related links to other sites is growing. This site would not exist if not for the dedication of our Web Site Chairman and Journal Editor, **Alan Voorhees**. When you see **Alan**, shake his hand thank him for the great job he is doing for all of us! Remember our web site address:

<http://www.wp.com/chrs>
Visit often!

Correction—Some of you may have seen a listing in the A.R.C. and in our **Journal** for a

meet on July 18th in Merced. The correct date is **Saturday, July 19th at 9am**. Sorry for any confusion this might have caused.

Journal—We are always looking for articles for the **Journal**. Since the popularity of transistor radios continues to grow, it would be great to have articles or a regular column about them. Who of our veteran transistor collectors is ready to accept this challenge? You get the idea, start writing! Thanks to all who sent in want ads and keep them coming. Remember they are free to current members. We received a call on the **HOTLINE** from a member in Illinois giving the **Journal** rave reviews. Thank you **Alan**, and keep up the great work!

Name Badges—**Norm Lehfeldt**, our Badge Chairman, is taking orders for the new plastic name badges. This attractive new and improved badge features our favorite "Sky Terrier" logo and now features 3 lines of type! Also the first 2 lines have larger type, making this badge easy to read. All these improvements cost you only 25 cents more. Send your check for \$7.00 along with your 3 lines of information to: CHRS, P.O. Box 31659, San Francisco CA 94131. Show your support for CHRS by ordering a new badge today!

Technical Reprint Service—Our Technical Advisor, **Larry Clark**, continues to offer Reprints of schematics or other materials from the CHRS Library. Just send a note to **Larry** and let him know what you need. Enclose a self addressed stamped envelope and \$1. Mail to:

Larry Clark
438 York Dr.
Benicia, CA 94510
(707-745-9132)

Or if you need assistance with a repair project, call **Larry** and maybe he can help. Thanks **Larry**! The Library is still looking for **Rider's Vols.** 17 through 23. If you have these and aren't using them call the **HOTLINE**.

Service Guide—The **HOTLINE** receives many calls from people who want to get radios, auto radios, televisions, transistors, or phonographs, (wind-ups and electric) repaired or restored. Sometimes it's easy to refer them. Sometimes it's not. Sometimes they are looking for service in a specific location in the Bay Area or the state. We would like to compile a **Service Guide**, composed of members who take in repair or restoration

work. It will cost you nothing to be listed if you are a current member. Just send your name, address, phone number and your repair specialties to: CHRS, P.O. Box 31659, San Francisco CA, 94131. Or leave the information on the **HOTLINE**. 415 821-9800.

Presidio Project—CHRS is involved with the **Perham Foundation**, in a project to restore the original radio station buildings in the historic Presidio of San Francisco. The eventual goal is to have these sites restored to original condition, display working historical gear, to possibly have a home for the **Perham Foundation's Electronic Museum** and to possibly build the **California Historical Radio Society Museum**. The CHRS Museum would not only contain radios, but other historically related media, such as phonographs, hi-fi equipment, historical audio gear, microphones, keys, etc. Please see **Bart Lee's** article for more information.

Museum Fund—Thanks to all who continue to donate to the **Presidio Museum Fund**. The Fund stands at almost \$1000!!! Thank you all. Keep the donations coming. There will be another auction to benefit this fund at the July 5th. event in San Francisco.



INFORMATION:

Collector Events—Here is the list of events for 1997. All events are subject to change or rainout. Please call the **CHRS HOTLINE**: 415 821-9800, for the best updated information. Please note the events that are "Tentative" or "To Be Announced."

July 5th. Saturday, 8am

San Francisco, St. Annes of the Sunset,
850 Judah St. off Funston (13th. ave.).
Sellers fee applies. Thanks to **John Wentzel** of **Aladdin Radio** for making the

CHRS WELCOMES NEW MEMBERS!

WANT ADS

arrangements. AUCTION for Museum Fund.

July 19th. Saturday, 9AM

Merced, at Cliff Berthelson's Radio Warehouse, corner of 13th. and X street. Sellers fee applies. Thanks for having us Cliff!

August 2nd. Saturday, 8am

Los Altos Hills, Foothill College, Lot "T." Sellers fee applies.

September 6th. Saturday, 9AM

Salinas, CA, St. Ansgars Lutheran Church, 72 San Joaquin. Sellers fee applies. Thanks to Howard Griffin for making the arrangements

October 4th. Saturday

Redding, The Shasta-Cascade Amateur Radio Society invites CHRS members to participate in their event. The location is "To Be Announced." Call Norm Braithwaite for details.

October 18th. Saturday, 9AM

Fairfield and Rio Vista, The Western Railroad Museum, state Rt.12. Collectors event and Picnic. No sellers fee, pay reduced museum admission. Thanks to Paul Bourbin for setting up this one.

November 1st. Saturday, 8am

Los Altos Hills, Foothill College, Lot "T". Sellers fee applies.

December

(nothing yet) Happy Holidays from CHRS.

Sacramento Chapter Meetings

Are held the 3rd Tuesday of every month. 7pm at the SMUD building, corner of Elkhorn and Don Julio, In Sacramento. All members are invited to attend!

I am always available to receive your thoughts and suggestions please call me at 415-821-7671 or leave a message on the HOTLINE at 415-821-9800.

HAPPY COLLECTING!

Steve

An organization such as CHRS needs and welcomes new members. New members bring in new ideas and enthusiasm and keep the club interesting and fresh. WELCOME!

Raymond Dart-Sunnyvale, CA
Donald Parker-Santa Rosa, CA
Karl Doll-Sunnyvale, CA
Brent Hokanson-Fairfield, CA
Peter Giles-Fremont, CA
Donal Bultman-Concord, CA
Eric N. Cogswell-Napa, CA
Marc L. Hughes-Sacramento, CA
Thomas L. Albrecht, KA9BJO-San Jose, CA
James M. Barnes-Pleasant Hill, CA
Douglas M. Henrichon-Southampton, MA
Mark L. Garriss-Chesterfield, VA
Bob Moore-Cupertino, CA
John F. Sweat-San Francisco, CA
Ken Davis, KD6GSE-Penn Valley, CA
Russ Dillberg-Vallejo, CA
Kevin Pontius-Mountain View, CA
Thomas R. (Dick) Husted-San Jose, CA
Jim Sullivan-San Francisco, CA
Clem Off-San Francisco, CA
Jon M. Smith-North Hollywood, CA
Robert F. Stein-New York, NY
Tom Callahan-Wichita Falls, TX
Robert Rossi-Allen Park, MI
Phil Steffora-Palo Alto, CA
John R. DeFreitas-Pembroke, MA



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Wanted: Wave Magnet for a Zenith T.O. model # &7G605 (bomber). 1L6 tube. Chris Rogers, 38 Smethurst Ave., Pakenham 3810, Victoria, Australia.

Help Wanted: Is there anyone in the Bay Area that can make minor repairs, and/or adjustments to a Zenith T.O. #D7000Y? Pete Warnke, 707 643-6202.

Wanted: Western Electric 2A (power supply), 7A (amplifier), 10D horn speaker and tubes: 216A, 217A, 104D, 205D, 350B. Ming Yang, 510 376-4220, fax 510 376-8861.

Wanted: chassis for Gloritone 27. Joe Selkregg, 408 980-0474.

For Sale: Old radios, \$50 to \$150. 1930's to 1950's. Restored and working! Jim McDowell, 510 798-4333.

Wanted: Ampex MR-70, universal audio compressors, mic pre-amps, EQs, other tube broadcast and studio items. Leave message. Mark Drury, 510 426-2300.

For Sale: Edison Model C-2, radio phono, unrestored, original. \$1000 or best offer. Wanted- assembly and operating instructions for a Globe "Chief" ham transmitter. "Zep" Bennett, 510 534-9576.

Wanted: Top \$\$\$ paid for art deco style sets with chrome or metal grills/trim 11930-1940 only. Also buying radio & other advertising signs, clocks, banners. Adam Schoolsky, 503 579-1080.

Wanted: RCA CED Videodisk players and movies. Art Adams, 415 321-4886.

For Sale: Misc. parts, hi-voltage caps, DCC wire, etc. Send SASE for list. Dan Smith. 8904 Cypress, Cotati, CA 94931. 707 664-8156.

For Sale: Thousands of tubes, various tube sockets, (e.g., Amphenol octal ceramic) and shields. Assorted hardware and components, (wire, resistors, insulators, grid/plate caps, etc.) Don Buchalter 510 569-3619.

Wanted: Any information about radio operations at the Presidio, 1901-1991. Please call Bart Lee, 415 788-4072(eves), 415 956-5959 #103(days).

WANT ADS

Wanted: Knobs for 10" Admiral plastic floor model TV. and fine tuning knob for 7" Motorola TV. Also, service: I repair auto radios. Roy Yost, 415 369-0890.

Wanted: Large Midwest table model w/half round dial (1941) and other Midwest radios and parts, what have you? For Sale: lots of tubes and knobs, (send want list or call). Also Victor wind-up/ Freed-Eisman radio phono combo, very rare and unique, \$450/offer. Mike Simpson, 408 867-7315.

For Sale: Columbia HG phonograph. Plays concert cylinders. Trade: Dyna Mark II plus cash for Dyna Mark III. Allan Hibsich, 916 589-0138.

Wanted: Western Electric tubes: VT2, VT25, VT52, 104D, 205D, 252, 262, 274, 275, 300, 310, 348; Globe tubes: 10, 45, 50, 280, 281, 585, 586; single-plated or etched-base 2A3; and transmitting: VT4C, 211, 212, 284, 800, 801, 834, 842, 845, 849, 851. Ming Yang, 510 376-4220.

For Sale: Zenith T.O. 700Y, mint exterior, Realistic Pro-2006, excellent, both \$300 or \$100-\$200 each. Would like to sell together. Other radios avail: Sony ICF-2010, ICF-5800, ICF 900. Radio Shack DX 440, DX 380, SW 100. Regency D810, G.E. Super Radio 3. Most in box, all with manuals, all work, some never used, some accessories available. Make offer or trade for working communications receiver. Pete Warncke, 707 643-6202.

Wanted: Televisions, Philco Predictas all models. All types of earlier TVs wanted. Send fax or description to Sheldon Donig, 340 Laurel Ave. San Anselmo, CA 94960 415 454-8851, fax 415 456-9322.

Wanted: Riders manuals, Volumes 17 thru 23. Call CHRS HOTLINE: 415 821-9800.

For Sale: CHRS Tee shirts, \$17, including postage. CHRS baseball caps \$10, including postage. Call 415 821-9800.

Wanted: Blue, etched, side mirror for Sparton 558 (4 knob). Chassis for Stewart Warner R469. Abbottwares "Hula Girl" Radio. Steve Kushman, 4233-25th. St. San Francisco, CA 94114. 415 821-7671.

Wanted: 1945-1953 Plywood radios from the following companies: Emerson model #503, #519, #535 or any with the perforated fronts; Tele-Tone #117, 117A with speaker holes; RCA model #28T. State price based on condition. Also want Zenith "radio nurse", brown plastic speakers. Steven Cabella, 500 Red Hill Ave., San Anselmo, CA 94960. 415 461-6810.

Wanted: Mini-tube and hybrid coat pocket size plastic radios, pocket crystal radios, hearing aids. I'll buy, or trade my transistor radios. Mike Brooks, 7335 Skyline, Oakland, CA 94611. Phone 510 339-1751.

Wanted: Majestic model 194 gothic cathedral cabinet, or a loaner to copy. Also Philco 60 chassis and speaker. Ben Martin, 18334 Pepper St., Castro Valley, CA 94546. Phone 510 582-6804.

For Sale: Send large SASE for tubes, parts, literature, radios or for books, magazines, catalogs, manuals. Two stamps, please, brings you both lists. Stan Lopes, 1201-74 Monument Blvd., Concord, CA 94520. 510 825-6865.

Wanted: Rack mount Navy radio RBC or RBB, or the cabinet alone. John Gibson, 1075 Sterling Ave., Berkeley, CA 94708. 510 849-1051.

Services Offered: Repair/replacement of meters before 1940. Wanted: Old meters/ Galvos before 1910. As is okay. Thanks, Leonard Cartwright, 879 Russet Dr., Sunnyvale, CA 94087. 408 739-6025.

For Sale: Hallicrafters SX-43 restored-\$175 (no speaker). You pay UPS, local pick-up preferred. Ted Stewart, 2157 Braemar Rd., Oakland, CA 94602. 510 531-7042.

Excellent condition, Model 43, 50 ohm. Dave Schutt, 22 So. Keeble St., San Jose, CA 95126. Phone 408 293-3437.

For Sale: Kenwood TH21-A, 2 meter hand held transceiver, new ni-cads, short and long rubber duck, charger and 115VAC supply. Original packing and manual, \$60. Henry Meyer, 30 Tobin Clark Dr., Hillsborough, CA 94010. 415 349-2071.

Wanted: UV-199 socket to make adapter to test tube at a 80 socket or an adapter. Edsel Erwin, 1513 E. Houston Ave., Fresno, CA 93720-2750. 209 299-5012.

Wanted: Atwater Kent model 20, big box radios, any condition. please state price. Paul Thompson, 315 Larkspur Dr., Santa Maria, CA 93455. 805 934-2778.

Wanted: Any information on the history, use, or development of the HT-4 transmitter by Hallicrafters. Mikhael Brown, 188 Sprucemont Place, San Jose, CA 95139. 408 578-6076.

For Sale: Electrolytic capacitors, NOS, two section- \$4, 3 section- \$5, four section- \$6. Some rated at 450 volts. Evan Powell, 4717 Conquista Ave., Lakewood CA 90713. 310 429-3793.

Wanted: Small knob (one) for W. E. Aeriola Sr., either filament or tickler. Gene Warner, 522 Weiman, Ridgecrest CA 93555. 619 446-2617.

Wanted: Antenna for Radiola Super VIII console, or details to construct one... pictures, dimensions, etc. Mark S. Rauber, P.O. Box 1077, Minden NV 89403. 702 782-3596.

Wanted: Vintage and collectable TVs and related items, other than parts or service literature. Eric Stumpf, P.O. Box 60245, Santa Barbara CA 93160. 805 964-9417.

Wanted: Good photos of tube type transmitters, transceivers, and allied equipment, for the next edition of 'Tube Type Transmitter Guide'. Gene Rippen, 105 Donnington, Auburn, CA 95603. Phone 916 885-6147.

Wanted: Pocket size reel to reel tape or wire recorders. Guy Doss, 736 Los Padres Blvd. Santa Clara, CA 95050. Phone 408 241-2437.

For Sale: Bird Wattmeter with case and six slugs: 2-30 Mhz 100w, 500w, 1000w- 100-250Mhz 25w, 250w- 200-500 Mhz 25w.

CHRS RESURRECTS HISTORICAL RADIO AT THE PRESIDIO OF SAN FRANCISCO

Bart Lee

CHRS's first use of Building 1444, the Coast Artillery Radio Station site

*Event photos:
Edith Dufey, Don Kojane*



The California Historical Radio Society has applied to National Park Service (NPS), along with the Perham Foundation, to rehabilitate to the Coast Artillery Radio Station site on top of Presidio of San Francisco, Robb Hill, building 1444. This application, facilitated by NPS Park Historian Steve Haller and other NPS personnel, has been viewed favorably, and will be presented to the Presidio Trust. CHRS member Joseph Chow, AIA, an architect, has offered to begin the architectural work needed for the restoration. George Flores, a lighting engineer from Los Angeles who has been working with Eric Dollard, preservationist, on the project to save the Bolinas transmitters, has agreed to act as Acquisitions Chairman to coordinate getting all of the materials needed for the site renovation.

Perham Foundation President Don Kojane has actively sponsored this project and the Perham Foundation has agreed to underwrite the estimated \$30,000 fundraising campaign needed for restoration. Working with him, Kip Crosby, president of the Computer History Association of California, is also sponsoring the Presidio project, looking to a museum site as well as an operating site.

On April 19, 1997, Earth Day, members of CHRS, Perham Foundation, and the Military Collectors Radio Net, and the Boy Scouts, also a consortium partner, worked with NPS personnel Eric Stewart and others, to restore native plant habitat on this site. After a morning of

hard work, Alex Seddio and Paul Thekan operated World War Two vintage radios for several hours. This activity put the Presidio "back on the air" as it was during one of its most interesting historical periods from one of its more interesting historical sites. A set of photos show the restoration, and the operation of the vintage radios. The event was a great success.

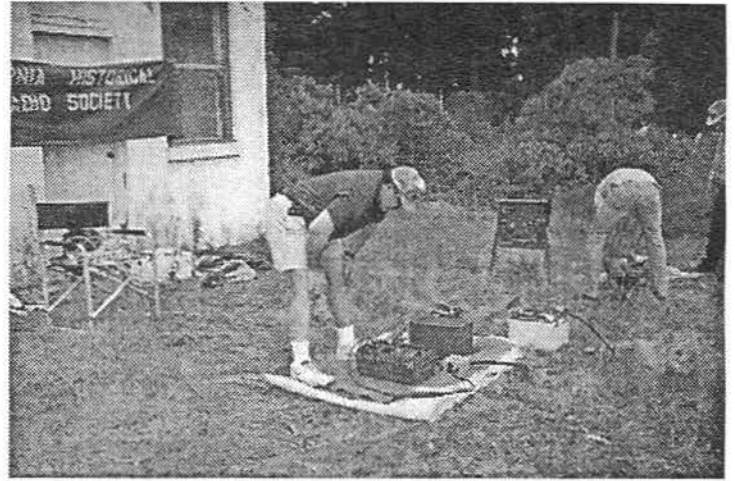
On May 17, 1997 many amateur radio operators and military radio stations celebrated Armed Forces Day with various radio-related activities. Many members of the Military Radio Collectors Radio Net operated vintage radio transmitters and receivers from historically interesting sites around California. Alex Seddio, from the Military Collectors Radio Net, operated one such radio from the Coast Artillery radio station site once again on May 17. No use was made of the building itself for safety reasons. Antennas were put up the evening before, and removed promptly. All personnel involved have been sensitive to the native plant habitat on the site, and site access was this time restricted to the radio operators. No electricity other than batteries was used. (These are very low power stations, free of safety or environmental hazard, comparable in power to five watt hand held Citizens Band transceivers or Park Police radios).

This radio resurrection was documented for NPS cultural resource purposes, as was the Earth Day use.





Steve Kushman operates.



Setting up.



Bart Lee and George Flores haul overgrowth.



Alex Seddio, Military Radio Collectors Net, operating vintage equipment.

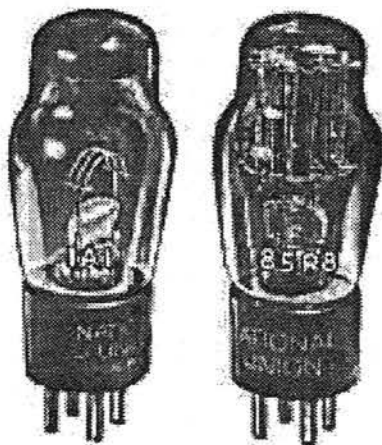


Vintage military radio operation with Cub Scouts from the Presidio.



Dan Ramsey, Steve Kushman, Russ Turner and others find the road to the radio station.

All About Ballast and Resistor Tubes



From the number of inquiries which have been I received recently, it is evident that there is considerable uncertainty among members of the radio industry regarding the function, purpose, and application of ballast tubes.

As applied to radio, a ballast tube is intended as a regulator to reduce or smooth out variations in voltage or current applied to the set caused by variations in the power supply, either power lines or batteries.

The term "ballast" is a general term which has been applied to all types of regulating tubes. The present popular types of ballast tubes should really be divided into three groups according to the type of service for which they are designed.

CURRENT REGULATORS

These are designed to maintain the current to the set (usually filament current) constant when the voltage of the filament supply battery varies during its life.

In battery-operated sets using 2-volt tubes the filaments of all of the tubes are wired in parallel and connected to the filament supply battery. For satisfactory operation of the set and satisfactory tube life the filament current to the tubes must be maintained fairly close to its rated value. During the life of the filament battery its terminal voltage gradually decreases, which means that the current delivered to the tubes in the set also decreases. Many of these sets use 2 drycells in series for a filament supply. When new these have a terminal voltage of about 3.3 volts so that obviously some resistance must be inserted into the set filament circuit so that the tubes will not get more than the rated 2.0 volts. An ordinary resistor would take care of that but as the drycells dropped in voltage during life, the voltage applied to the tubes would become lower and lower, affecting both the perfor-

mance of the set and the life of the tubes.

The current regulator tube is intended to replace this resistor and in addition to reducing the battery voltage to the proper value, it has the additional property of automatically changing its resistance so that, in spite of variations in the terminal voltage of the battery, the current supplied to the tubes is held constant.

Since the filaments of the tubes in battery sets are all wired in parallel each different combination of tubes requires a different regulator tube.

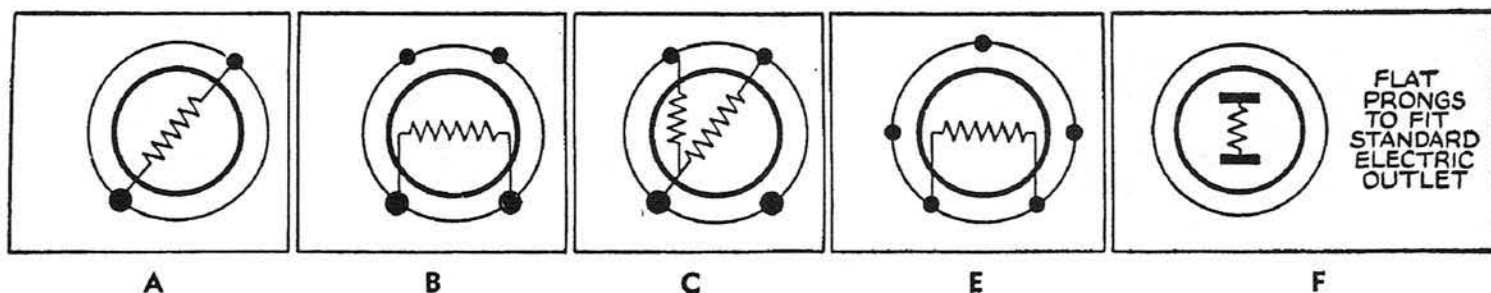
For example, a set using 1-6C6, 2-34's, 1-32, 1-30, and 1-19 would have a total filament current of 0.620-ampere and would use a type 1J1 current regulator (see Table).

To determine the proper current regulator for any set, it is simply necessary to determine the total filament current and use the regulator tube having that rating. The total set current can be determined by noting the number and type of tubes in the set and determining their respective filament currents from published characteristics such as found in the "National Union Handbook."

VOLTAGE REGULATORS

These are designed to maintain the voltage to the set (usually plate and/or screen) constant when the current drawn by the set varies. Tubes of this type are not usually encountered in ordinary broadcast receivers.

The voltage regulator has the property of automatically varying the amount of current which it draws so that the voltage across its terminals remains constant. If one of these regulators is connected as part of the voltage divider across a power supply, the voltage across the regulator will remain constant regardless of variations in current through the divider or voltage variations from the power supply.



The operation of a voltage regulator may be explained by a simple analogy. Suppose we build a dam across a river. Let the water coming down the river represent our power supply voltage, the dam represent our voltage regulator, and the level of the water above the dam the voltage supplied to the set. No matter how much water comes down the river, the level above the dam will remain approximately constant because all the surplus spills over the dam.

LINE BALLASTS OR RESISTORS

These are designed for use as line dropping resistors in A.C.-D.C. sets and are normally connected in series with the filaments of the tubes in the set.

In this type of set all of the tube filaments are wired in series. Since the total filament voltage required is normally much less than 110 volts, a resistor or regulator must be connected in series with the filaments to make up the additional voltage drop.

The purpose and function of the line ballast are similar to the action of the current regulator described previously. The ballast tube automatically varies its resistance so that the filament voltage and current are maintained at proper values in spite of variation in line voltage.

Several of the so-called ballast tubes are nothing but resistors and have little or no regulating action. In purchasing be sure to secure true regulators and not just resistors mounted in a metal tube can.

The proper size or type of ballast to use is determined by the filament current drain and the number of tubes in the set. Some of these types are supplied with taps for lighting one or two pilot lights.

There is another type of ballast regulator for A.C. sets. This type is connected in series with the primary of the power transformer,

and is intended to keep the transformer voltage constant regardless of variations in the voltage.

In Table 1 (at end of article) are listed all the glass-envelope tube types shown in Table II and referred-to in basing illustrations A to I (incl.) at the top of this and the facing page.

METAL BALLASTS

In addition to the previously-described group of glass-envelope ballast and resistor "tubes" there is also a group of metal-envelope resistance units which the serviceman frequently encounters. One type in this group is National Union Co.'s type known as the Ballastron; it is available in 2 models, designated A and B. These 2 Ballastrons serve as replacements for over 100 R.M.A.-coded ballast tubes and many special radio manufacturers' types.

On the base of the Ballastron is an ingeniously-arranged metal strip (see Fig. 1A) which short-circuits 3 sections of the resistance unit inside the metal envelope. By snipping or filing this metal shunt all the way through at one or more of the 3 locations, between Prongs 3 and 6, indicated by dots of colored paint, the short circuit between any 2 prongs is thus removed and the respective resistance section cut into circuit.

A second ingenious arrangement is found in base prongs 2 and 8 which may be unscrewed and removed if they are not required. Here is where the difference exists between the type numbers (A and B) of these metal-envelope ballasts: removable terminals 2 and 8 tap onto the internal resistance unit (see Fig. 1B) to provide ballast operation of a pilot light as described in the caption of Fig. 1.

Terminal 1 is the connection ordinarily used on metal tubes to ground the shell. The resistance element of the Ballastrons, which is

made by winding helical-wound resistance wire lengthwise on a mica strip as shown in Fig. B, is tapped-off to terminals 2 to 8 as shown in Fig. 1B. 1B. The drops across the various taps of this voltage divider are shown here for the first time in any radio magazine. The drop across the pilot light section of the divider is the same for either current rating (that is, for either the A or B type ballast "tube").

Ballastrons may be "matched" to the requirements of ballast resistors, carrying R.M.A.-code numbers, in accordance with the directions in the chart, Table III. Also, they may be adjusted to suit the characteristics embodied in various factory-coded units, some of which are listed in Table IV.

NOTE: If a ballast tube has a first letter "B," disregard it (Example: Ballast tube No. BK-55-D is K-55-D on chart). If the first letter is "M," substitute "K" for it (Example: Ballast tube No. M-55-D is K-55-D on chart). To replace an I-C tube, follow directions for a K-C tube but change pilot lamps to 150 ma. (Type No. 40, brown bead.)

This article has been prepared from data supplied by courtesy of National Union Radio Corp.

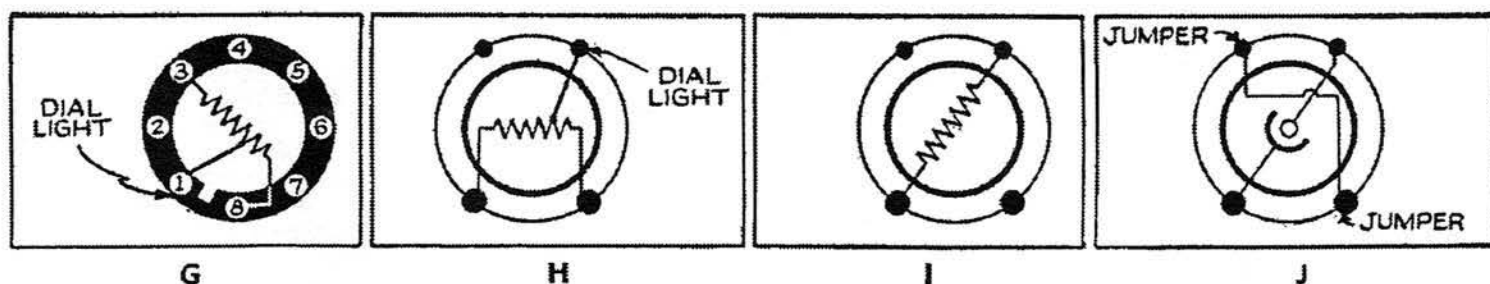


TABLE I

Maker of Set	Part No.	Choose Tube	Remove Pins	Cut Strip
Emerson	2UR224	B	2	R-Y
Emerson	2UR215	B	2	R
Emerson	3CR241	B	None	R
Crosley	W43357	A	2	R
RCA	RC294 or 135K1	A	2	R
RCA	RC300 or 95K2	B	2	Y
RCA	RC345 or 190K1	A	2 & 8	R-Y
DeWald	8598	B	2	R
Fada	115.4	A	2 & 8	R

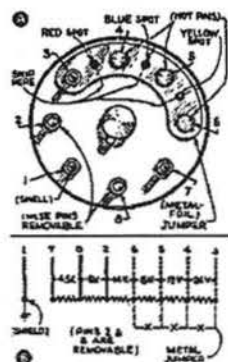


TABLE II

Type No.	Current Rating	Voltage Drop	Normal Use**	Exchange with	8	0.30	132	d
1-1	0.120	0.3-1.2	a		8-A-5	0.80	5-25	b
1A1	0.500	0.3-1.2	a	5-1, 5E1, 6AA	9	0.30	80	c
1A2	(0.120)				9-20	0.90	20-40	h3
	(0.320)	0.3-1.2	a	30	106			
1-A-5	0.1	5-25	b		9-150	0.90	30-60	e
1B1	0.360	0.3-1.2	a	3H-1	9-A-5	0.90	5-25	b
1B2	(0.260)				9V10	0.80	5-25	b
	(0.360)	0.3-1.2	a	31	10-10	1.00	10-30	h2
1C1	0.750	0.3-1.2	a	7H-1	10AB	0.550	0.3-1.2	a
1C2	(0.120)				10-A-5	1.00	5-25	b
	(0.250)	0.3-1.2	a	52	10V10	1.00	10-20	h1
1D1	0.250	0.3-1.2	a	2H-1	11-10	1.10	10-30	h2
1E1	0.480	0.3-1.2	a		11-20	1.10	20-40	h3
1F1	0.720	0.3-1.2	a	7-1	11-150	1.10	30-60	e
1G1	0.420	0.3-1.2	a	4-1	11-A-5	1.10	5-25	b
1J1	0.620	0.3-1.2	a	6-1	12-20	1.20	20-40	h3
LH-1	0.180	0.3-1.2	a		13-10	1.30	10-20	h2
GM-1					13-20	1.30	20-40	h3
2	0.30	9.0	g		13-A-5	1.30	5-25	b
2-A-5	0.20	5-25	b		14-20	1.40	20-40	h3
2H-1	0.240	0.3-1.2	a	1D1	14-A-5	1.40	5-25	b
2H-5	0.250	5-25	b		15-10	1.50	10-30	h2
3	0.30	128	d		15-20	1.50	20-40	h3
3-1	0.300	0.3-1.2	a		18-10	1.80	10-20	h1
3-40	0.30	45-80	c	300*, GOX3*, 5BX3*, 5B*	20-A-5	2.00	5-25	b
					22-10	2.20	10-30	h2
					30	(0.120)		
3-150	0.30	30-60	e			(0.320)	0.3-1.2	a
3-220	0.30	130-170	d		31	(0.260)		
3-A-5	0.30	5-25	b			(0.360)	0.3-1.2	a
3H-1	0.360	0.3-1.2	a	1B1	038	1.10	38	
3H-220	0.35	70-130	f		42A1	0.30	42.3	m
4	0.40	115	d		42A2	0.30	42.3	m-1
4-1	0.420	0.3-1.2	a	1G1	42B2	0.30	42.3	m-2
4-220	0.40	70-130	f		46A1	0.40	30-60	k
4-A-5	0.40	5-25	b		46B1	0.30	30-60	k
4H-5	0.45	5-25	b		49A1	0.30	48.6	m
4H-220	0.45	70-130	f		49A2	0.30	48.6	m-1
5	0.46	115	d		49B2	0.30	48.6	m-2
5-1	0.500	0.3-1.2	a	1A1, 5E1, 6AA	52	(0.120)		
5-16	0.500	0.3-1.2	g			(0.250)	0.3-1.2	a
5-150	0.50	30-60	e		55A1	0.30	54.9	m
5-220	0.50	70-130	f		55A2	0.30	54.0	m-1
5-A-5	0.50	5-25	b		55B2	0.30	54.9	m-2
5E1	0.500	0.3-1.2	a	1A1, 5-1, 6AA	70	0.90	30-60	k1
5H-1	0.550	0.3-1.2	a	10AB, 1K1	90	1.40	30-60	k1
5H-5	0.55	5-25	b		98	0.98	30	h3
5H-200	0.55	70-130	f		100	1.0	30	
6	0.695	0.3-1.2	a		105	1.05	30	
6-1	0.620	0.3-1.2	a		106	1.06	30	
6-20	0.60	20-40	h3		110	1.10	30	
6AA	0.500	0.3-1.2	a	1A1, 5-1, 5E1	118			
6-A-5	0.60	5-25	b		125			
6H-1	0.660	0.3-1.2	a		126			
D6-1	0.060	0.3-1.2	a		130	1.3	20	
7	0.30	176	d		140R	0.30	42.3	m
7-1	0.720	0.3-1.2	a	1F1	140-R4	0.30	42.3	m-1
7-20	0.70	20-40	h3		140R8	0.30	42.3	m-2
7-150	0.70	30-60	e		150	1.5	20 1	5-10
7-A-5	0.70	5-25	b		155			
7H-1	0.760	0.3-1.2	a	1C1	158			

TABLE III

				R.M.A. Tube No.	Ballast Equivalent	Cut Strip at Colors R=Red B=Blue, Y=Yellow	Unscrew Pins and Clip Off Screws
165R	0.30	48.6	m				
165R4	0.30	48.6	m-1				
165R8	0.30	48.6	m-2				
185R	0.30	54.9	m				
185R4	0.30	54.9	m-1				
185R8	0.30	54.9	m-2				
218							
313	1.3	30					
314	1.4	30					
315	1.5	30					
415							
425							
449							
460							
538	1.05	38					
838							
874	0.01-0.05	90	n				
876	0.70	40-60	h4				
886	2.05	40-60	h				
*Line Resistor, not a tube.							
**Notes on normal use:							
(a) For use in operating 2.0-volt tubes from Air-Cell or 3-volt drycell batteries. When used this way, no other resistor is necessary in the filament circuit, and none should be used. When operating from a 2-volt storage cell the ballast tube should be shorted out of the circuit. The voltage drop of this group of ballast tubes is sometimes shown as 1.0 volt, although the actual drop is as shown in this table; depending on the voltage of the battery.							
(b) For use in receivers designed for operation on 110 volts, and are usually connected in series with the primary of the power transformer.							
(c) For use in place of the resistor type of line cord in A.C.-D.C. receivers operated from 110-volt lines.							
(d) Used to operate A.C.-D.C. receivers from a 220-volt line.							
(e) Used in place of those in group (b) when operating 110-volt receivers from 150-volt lines.							
(f) For use when operating 110-volt receiverzr from 220-volt lines.							
(g) For use with sets designed to operate from 32-volt lighting plants.							
(h) For use in the primary circuit of receivers designed for use with a ballast in series with the transformer primary. The primary of the transformer should be designed for the following voltages:							
h1.....100 volts h3.....85 volts							
h2.....85 volts h4.....65 volts							
(k-k1) These types are for use in Majestic receivers. Types marked (*) are manufactured by several manufacturers of tubes. The types marked k1 are designed to replace the fixed resistor type line ballasts used as original equipment in Majestic receivers.							
(m) To replace the resistor cord in A.C.-D.C. receivers and do not have tap on resistor shown in diagram.							
(m-1) Same as above except that they have a tap for operating one 6-8 volt pilot light.							
(m-2) Same as group (m) except tap for operating two 6-8 volt pilot lamps.							
(n) This type is a voltage regulator rather than a ballast; and is used in some of the older receivers to provide constant voltage from a 90-volt tap of the power supply.							

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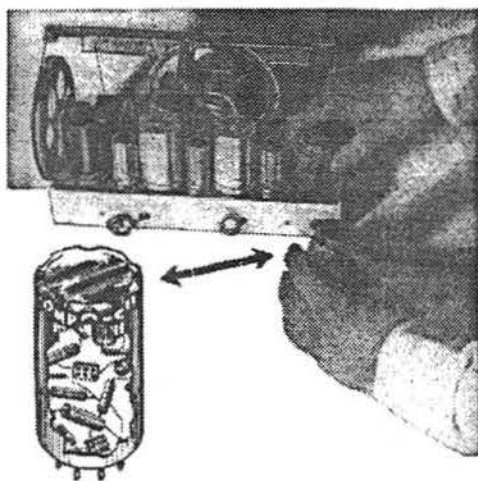
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THE RADIO THAT FIXES ITSELF

Roberto Brenta, *Radio-Craft*, December 1947

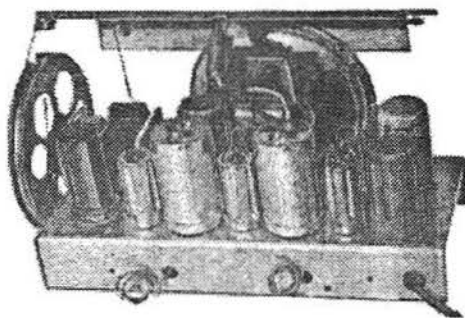


Here is an authoritative article on the much-discussed Cosmo Compo radio, written by the man that invented it. This receiver, which is already being sold in metropolitan department stores, has been hailed by some non-technical writers as a means of emancipating the radio owner from the repairman. Read what the inventor, himself a former radio serviceman, has to say on that subject.

These Compo cans may be changed in a fraction of a minute, curing any trouble due to the enclosed component. As one of the cans contains the complete audio-circuit and another all the filler components, it is obvious that a radio can be repaired in a few minutes. The drawing at left is the artist's conception of the contents of one (which one?) of the Compo cans above.

Before anyone can honestly call himself a radio repairman he must have a thorough knowledge of radio electronics. He must be familiar with all types of radio receivers. He must have the proper tools and equipment to give proper service.

For many years many complex problems have faced the radio repairman from the time he puts a radio receiver on his bench till he returns it to its owner in playing condition. It is not uncommon for him to find himself on the short end of a deal. When all the time, energy and materials that go into the repairing of a radio are considered, there is always the chance that he will not make any profit and may lose money. That may sound strange to the layman, but is recognized by the repairman as an everyday possibility. For example, the customer doesn't realize that the breakdown that occurs several days after his set has been fixed has absolutely nothing to do with the original trouble. He insists that the repairman did a poor job and is responsible for putting the set right without further cost. In some cases the cost of additional parts that are needed plus the added time spent in repair exceeds the price of the original estimate.



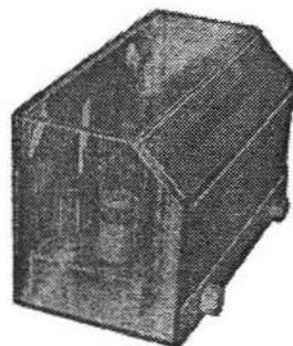
A serviceman's dream

This among other things prompted me to try to find a suitable answer to the problem. During my years studying engineering in the Navy as a radio technician, I had little time to

work on the idea. We worked night and day building and repairing radios of all types. Sometimes we had plenty of tools and materials—at others we lacked almost all the proper parts and replacements. Most serious of all, we were understaffed because of the lack of trained technicians. When a component was unobtainable we either had to improvise or scrap an entire unit or set.

I began to think again about my old plan to simplify radio receivers. Seeing all the waste proved to me that the time was ripe for a radio that would eliminate the complexities of hundreds of parts and wires and reduce the repairman's problems by expediting the work.

When the war in Europe ended I was stationed in Guam in the Pacific. With the



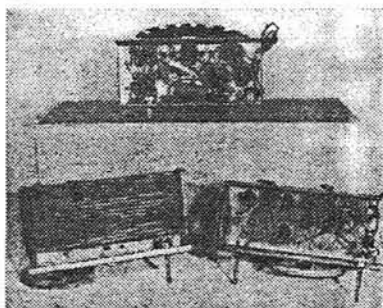
cessation of hostilities in the West our job lessened daily. I began to get a few hours for myself each day and used the time for experiments. I wanted to find a way to reduce unnecessary waste. I wanted to find a way to utilize the cast-off parts and units that were deteriorating from lack of use. It struck me that if I took several parts, or better still, a complete circuit and tied the parts together in a single replaceable unit I would have the answer I was looking for. From the beginning I toyed with the idea of segregating into sections a conventional 5-tube circuit.

The first experimental set gave me quite a bit of trouble because of the long grid leads. This was eliminated by re-arranging the socket positions. I realized then that with further engineering effort such a radio was a practical possibility. Another big problem was the size of the filters, resistors and condensers. It was impossible to squeeze those components into a unit of practical size. I then considered the use of miniature components, which was the answer to the problem of re-

ducing the size to fit the containers. There was always something to slow up my progress. After solving the difficulties of putting r.f. components into cans, I ran into trouble with audio quality. This was solved by special attention to matching the output transformer, output tube and speaker, and by using a 50B5 output tube.

The Compo receiver

In brief, I have succeeded in developing a compact AM receiver in which all the elements of a superhet circuit have been made plug-in. Oscillator and i.f. units are pretuned and there is sufficient tolerances to make



Top: An old style set with its maze of under-chassis wiring and dangling components. Lower right: Present Compo receiver. Lower left: Stamped-wiring Compo receiver of the future.

interchangability of units quite practical. All the normal under-chassis resistors and capacitors are included in their respective, leaving nothing underneath but the filament wiring. Volume control will be plug-in eventually.

The present model consists of 5 vacuum tubes: 12BE6, 12BA6, 12AT6, 50B5, 35W4. In addition there are 6 component tubes which are color-coded and numbered. The oscillator section includes a specially designed oscillator coil with the coupling from the coil to the grid and the grid resistor. The first and second intermediate frequency transformers are in two separate cans or containers. Also in these containers are the automatic volume control line and the first audio grid input. Then there is the power supply consisting of a filter and filter resistor.

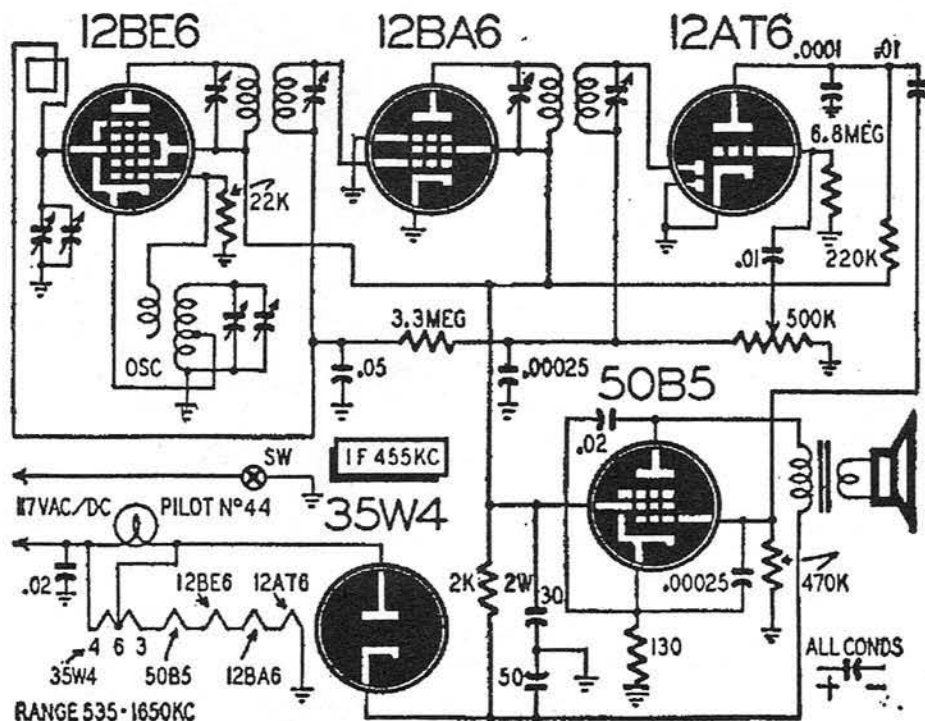
Included in the Compo cans are the following parts: Oscillator is in a green can numbered 114; the first i.f. is in a blue can numbered 115; the second i.f. is in a black can numbered 116; the a.v.c. is housed in a yellow can numbered 117; the audio output is in a brown can numbered 118; the filter is in a red can numbered 119. There is also a 35W4 rectifier, an 12BE6 converter mixer, 12BA6 i.f. amplifier, 50B5 power output and a 12AT6 detector and first audio.

A test has been going on in the laboratory since June 9th. A Compo receiver has been in operation 24 hours a day without interruption under normal operating conditions. So far, the set has been working perfectly and without any signs of difficulty.

A plug-in amplifier

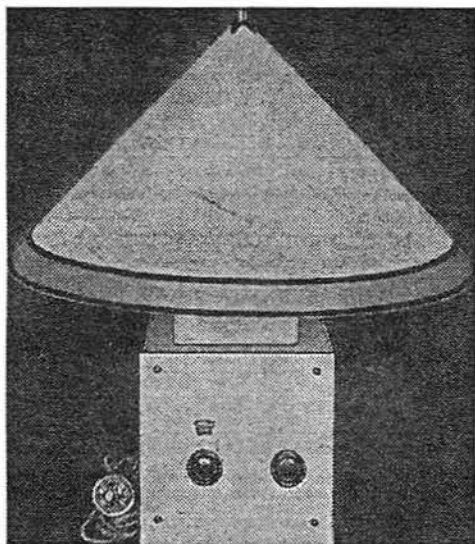
Using the same principles, a 40-watt experimental amplifier has also been developed. In this case, I have worked out the amplifier so that all the condensers and resistors are wired on a plug-in fibre panel. If anything goes wrong all that has to be done is to remove the entire unit and replace it with a completely new working part. The part that has gone bad can then be repaired and used as a spare.

The Compo system could well be extended to include not only receivers and public address systems, but to cover many types of electronic devices. It would be particularly valuable in commercial and industrial equipment where the time lost in repairing a piece of equipment is more valuable than the price of the parts. A stock of replacement units might in such cases save costly delays, or even the cost of complete standby equipment.



HOW TO BUILD THE "RADIOLAMP" TABLE RECEIVER

Clyde Fitch, *Radio-Craft*, May 1933



This article describes the construction of a miniature radio set combined with a table lamp—the lamp serves as the limiting resistor in the filament circuit.

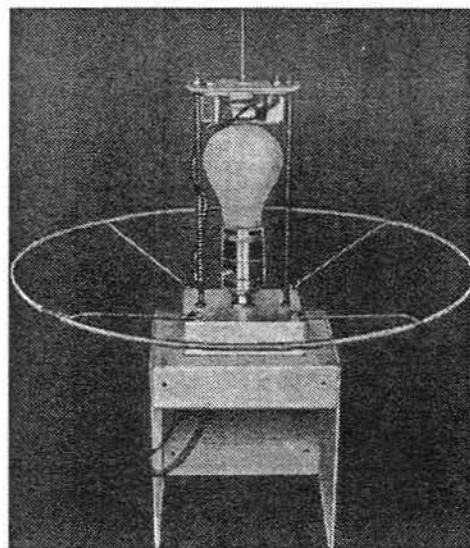
In the February, 1933 issue of *Radio-Craft* there appeared the first complete description of one of the new miniature radio receivers. It seems as though, overnight, this type of set has earned its spurs, and has swept the country by storm. It not only fills a great public need, but, to the ingenious radio fan, it offers unlimited possibilities for home-made sets of novel design. For example, the "Radiolamp," illustrated herewith, was made possible by following the general principles of miniature set construction and combining them with a lamp. Also, the variety of new tubes now available, mainly the 6-volt, .3-ampere automobile type, which is used in this set, makes possible many interesting set combinations for the home constructor.

The Radiolamp, see Fig. 1, contains three tubes and a rectifier. The first tube is a type 39, R.F. pentode amplifier, coupled to a type 36 screen-grid detector, which is, in turn, resistance coupled to a type 38 output pentode. The rectifier is a type 12Z3. All of the tubes except the rectifier have a 6.3-volt heater which operates at .3-ampere. The rectifier has a 12-volt filament also rated at .3-ampere.

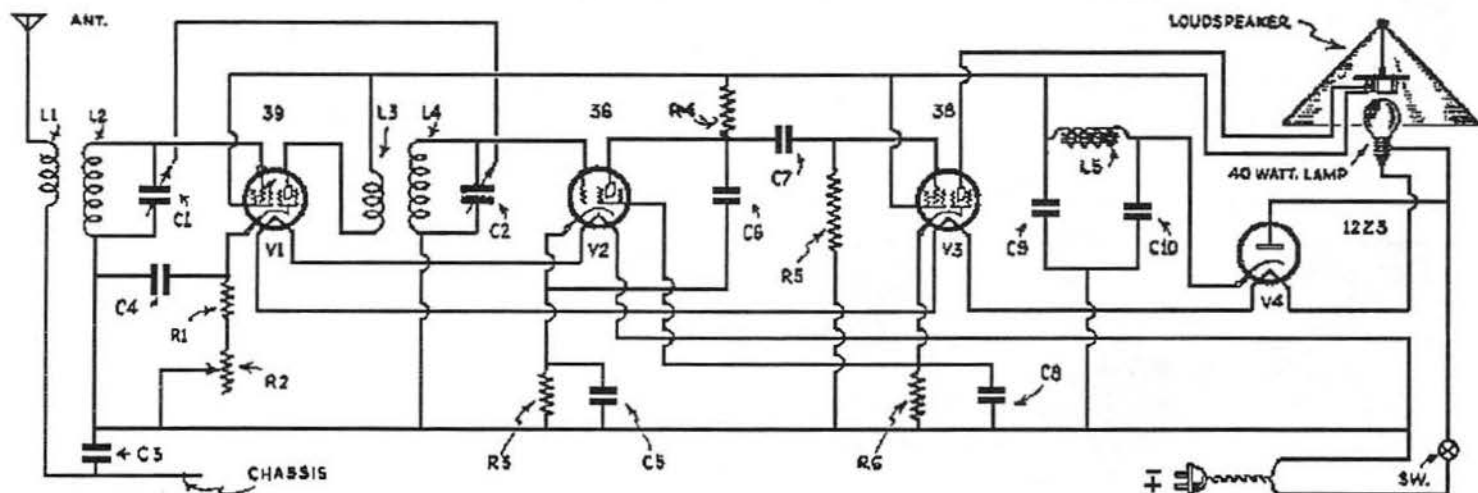
This tube has an indirectly heated cathode, and, although of the high-vacuum type, it has a low internal voltage drop, which does not cause any appreciable reduction in voltage available for the plates of the tubes.

Miniature radio sets are made universal; that is, they operate on both A.C. and D.C. The filaments of the tubes are connected in series and are connected directly to the 110-volt line through a limiting resistor, thus avoiding the use of filament transformers. The

limiting resistor causes a voltage drop of some 85 volts, and, consequently, at .3 ampere, it must dissipate about 25 watts of electrical energy in the form of heat. For this reason many miniature sets get hot enough to fry eggs on! This condition is one important reason why the combined set and table lamp is a logical combination, as the limiting resistor is eliminated and the lamp bulb takes its place, thus converting energy which was formerly wasted, into useful light.



A table lamp requires a shade. By making the lamp of modern design, the shade may be in the shape of a cone, thus making it suitable to serve as a loudspeaker diaphragm. Without the limiting resistor and the loudspeaker in the set, the set itself can be made smaller, so that there will be ample room in the base of the lamp for the set without making the base unduly large.



Another important reason for combining the set and lamp is that a much larger cone can be used than is ordinarily used in a miniature set, and the tone quality is thereby considerably improved.

The Radio Chassis

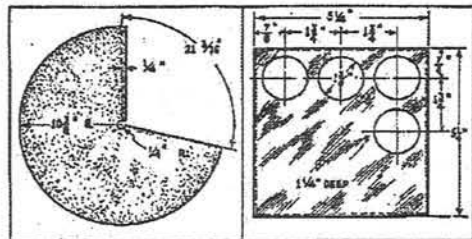
Figure 1 shows the schematic diagram of the receiver. The circuit is conventional and is typical of the type used in many commercial miniature sets. It is a simple set to wire, and one should have no difficulty in making the connections. One point to observe is that the type 36 detector heater is connected to the negative side of the line, assuming the set is plugged into a D.C. outlet. This is important in order to reduce hum to a minimum when the set is used on an A.C. line. From the negative side of the line the current passes through the detector heater, then the type 38 R.F. tube heater, into the type 78 A.F. tube heater, and through the rectifier tube filament into the lamp filament and back through the switch to the other side of the 110-volt line. A 40-watt Mazda lamp is the correct size to use with this set.

We can also trace the plate supply from one side of the line through the switch to the rectifier plate, out through the cathode of the rectifier to the filter choke L5, and on to the other tubes. About 95 volts are available for operating these tubes, whether used with an A.C. or a D.C. light line supply.

Another point to observe is that the screen of the detector tube is connected to the cathode of the type 38 tube so that a positive potential is obtained for the screen which is equal to the grid bias of the type 38 tube.

All of the parts are marked in the diagram with the same symbols as used in the other illustrations and in the List of Parts. Note that the metal chassis is insulated from all of the wiring by means of the insulating condenser C3. This procedure is followed to avoid any possibility of a short circuit or serious shock should the metal chassis become grounded accidentally, as usually one side of the light line is grounded, and the negative "B" supply is connected directly to one side of the line. For this reason it is important, in mounting the two-gang tuning condenser, C1 and C2, and the electrolytic filter condensers, C9 and C10, to use insulating bakelite washers under

the screws and make sure that the mounting screws do not touch the metal chassis. The volume control, R2, is mounted on a bakelite support for the same reason. For the values of the parts, the reader should refer to the List of Parts. For the locations, the photographic illustrations, mainly Figs. C and D, should be observed.



The metal chassis and lamp frame-work are clearly illustrated in Figs. 2 and B. Fig. 3 shows a plan view of the radio chassis with the location of the holes for the tube sockets indicated. One sixteenth-inch aluminum shield can material is used throughout. All of the important dimensions and other information are given in Fig. 2. Note that the holes in the top and bottom part of the lamp base, the bottom of which is also the radio chassis, are threaded so that the sides, front, and back plates may be removed easily. The top of the lamp base is made exactly the same size as the radio chassis, or bottom. The small chassis mounted on top helps support the two rods which support the loudspeaker unit and the wire frame for the shade and, also, improves the general appearance of the lamp.

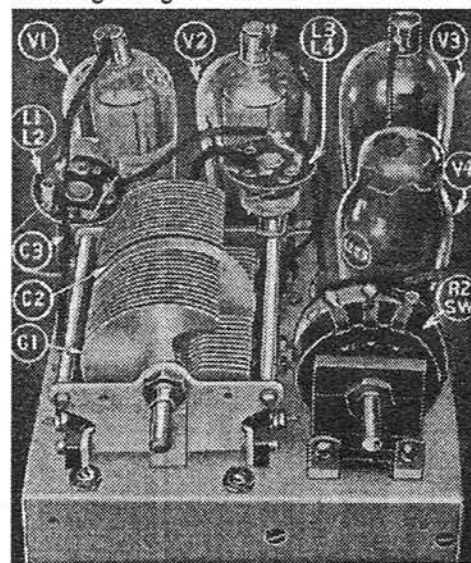
The "Radiolamp"

The combined lamp shade and loudspeaker cone is cut from a piece of white drawing paper to the size shown in Fig. 4. Ordinary lamp shade parchment should not be used as the oil it contains deadens the sound. The white drawing paper works very well for both lamp and speaker, and may be given a coat of white shellac to improve its appearance. The shellac should be applied after the border design, if any, has been painted. The design itself may be made to suit the builder's fancy. After the paper is cut out as shown in Fig. 4 and decorated and shellacked, it should be glued along the seam with rubber cement, forming it into a cone. The tip of the cone is clamped with metal apexes similar to those used in cone-type loudspeakers. This allows it

to be attached to the drive pin of the loudspeaker unit.

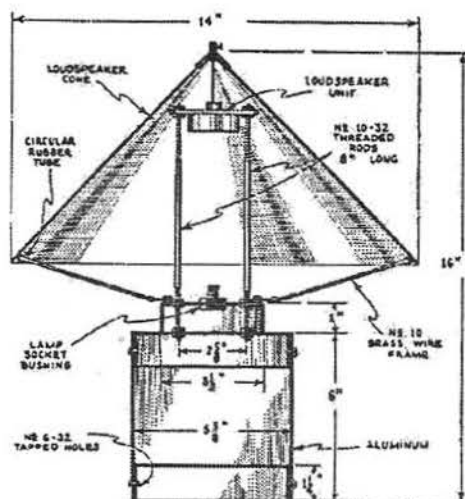
When assembled, the cone rests on a ring support made of No. 10 brass wire covered with a soft rubber tube. This ring is 13-1/2 inches in diameter and is supported at the lamp base in four places as shown in the photographic illustration, Fig. B. This wire support is soldered together.

The loudspeaker unit was taken from a Premier miniature cone speaker and mounted directly on the threaded rods as shown, using the mounting holes already in the unit. The drive pin was extended to fit the new cone by soldering a longer one to it.

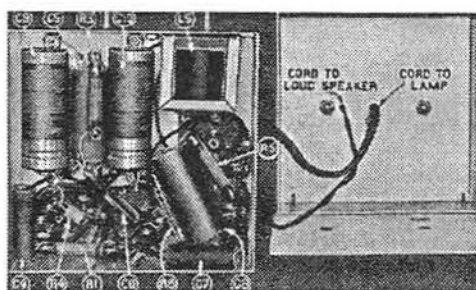


In assembling the complete unit, the radio chassis, of course, should be built and wired first. Two wires are run from this unit up through holes in the top to the loudspeaker, and two more run up to the lamp. A lamp cord enters the back of the chassis through which connection to the line is made. The aerial lead is attached directly to one of the coils and extends through a hole in the back.

The loudspeaker lamp shade assembly may then be mounted to the top of the lamp base and the two side pieces attached. This supports everything, and the connections to the lamp and to the unit may be made, making sure that enough slack is left in the wires so that the chassis may be removed without disconnecting them. The front can then be drilled for the volume control and tuning dial shafts, and a window cut in to show the tuning dial readings. The tuning dial is simply a celluloid dial forced onto the condenser



shaft and cemented on the shaft. This touch practically completes the construction of the unit. The reader should carefully study the



various illustrations and note

especially how the coils are mounted directly on the tuning condenser with small brass supports. They are mounted at right angles so as to reduce oscillation.

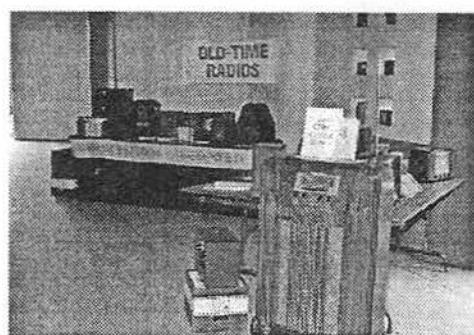
Operating the Set

The operation of this set is quite simple. While it may not be as selective as larger T.R.F. or superheterodyne receivers, or give the power output, it is extremely sensitive and picks up many stations with a small indoor aerial. No shielding of the tubes is shown in the illustrations. In some cases, if oscillation becomes serious, it may be advisable to place a metal shield around the detector tube and also to shield the detector control-grid lead. The condenser has a shield built in it between the two units. This feature and its small size and specially cut plates facilitate tuning considerably, making it ideal for this type of receiver. The coils also are so compact that shielding is usually not required. If a very long aerial is employed, it is advisable to

connect a .0001-mf. fixed condenser in series with it.

List of Parts

One Cardwell two-gang midget condenser .00035-mf; C1, C2;
One sprague fixed condenser .1-mf.; C3;
One Aerovox fixed condenser .01-mf.; C4;
One Aerovox condenser .5-mf.; C5;
One Aerovox fixed condenser .0001-mf.; C6;
One Aerovox mica. fixed condenser .02-mf.; C7;
One Solar electrolytic condenser, 4 mf.; C8;
Two Aerovox electrolytic condensers, 4 mf.; C9, C10;
One Aerovox pig-tail resistor, 150 ohms, R1;
One Acratest volume control with switch, 250,000 ohms, R2;
One Aerovox resistor, 50,000 ohms, R3;
One Acratest resistor, 2.5 megohms, R4;
One Aerovox resistor, R6;
One Aerovox resistor, 1,500 ohms, R6;
Two Find-All aerial couplers L1, L2 and L3, L4;
One 15 henry choke, L5;
One type 39 tube;
One type 36 tube;
One type 38 tube;
One type 12Z3 tube;
One 40-watt lamp;
One Premie; loudspeaker unit;
Three five-prong sockets;
One four-prong socket;
One lamp socket with bushing;
One cord and plug;
One celluloid dial;
Cone apex, cone and fittings;
Two Blan chassis, 5-1/4 by 6 1/4 by 1-1/4 ins. deep, 1/16" aluminum;
One Blan chassis, 3-1/2 by 3-1/2 by 1 in. deep;
Two Blan sides, 5-1/4 by 6 by 1/16 ins.;
One Blan back 5-3/8 by 6 by 1/16 ins.;
One Blan front 5-3/8 by 6 by 1/16 ins.;
Two No. 10-32 threaded brass rods, 8 ins. long;
Screws, nuts, etc.

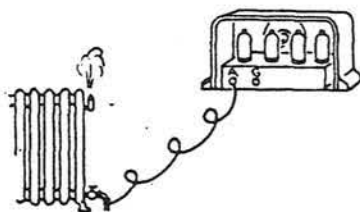


Above:
CHRS members turn out to promote radio and the organization with an impressive display of radio sets at the Alameda Naval Air Station, April 19th.

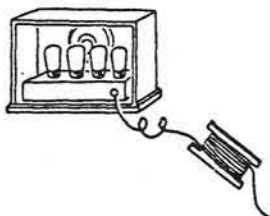


CHOOSING AN ANTENNA

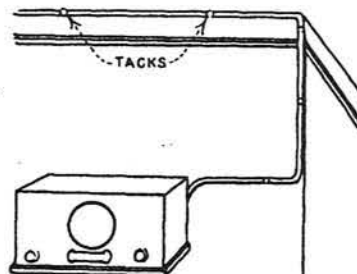
"No Radio Can Be Better Than Its Antenna"



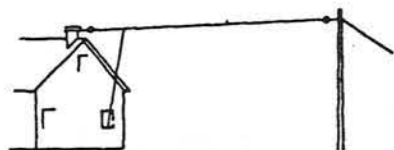
GROUND AS ANTENNA—Fair reception on local broadcast stations in some homes. Seldom satisfactory in suburban areas and useless for shortwaves. Use only where other systems cannot readily be installed, or for temporary service.



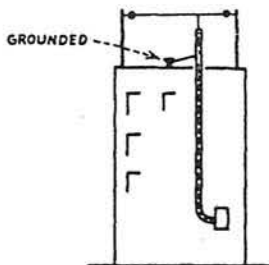
BUILT-IN WIRE—Good reception on local broadcast stations in all but extremely noisy buildings. Receives reasonably distant stations when used on upper floors in electrically quiet areas. Rarely effective on shortwaves and invariably noisy in large apartment houses.



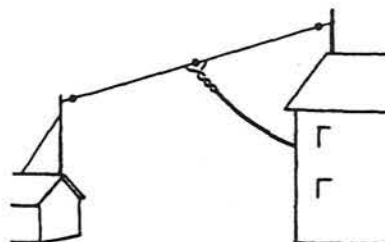
MOULDING STRIP—Good reception on local broadcast stations in all but extremely noisy buildings. Receives reasonably distant stations when used on upper floors in electrically quiet areas. Rarely effective on shortwaves and invariably noisy in large apartment houses.



ORDINARY OUTDOOR SYSTEM—Excellent on both broadcast and shortwave bands when building and vicinity are electrically quiet. Recommended for homes away from trolley-lines, high-tension wires, motors and busy roads.



SHIELDED LEAD-IN—Reduces noise pickup by download where this wire must pass through electrically disturbed areas. Good reception on broadcast band but not recommended for shortwaves. In common with other noise-reducing types, must have antenna proper mounted out of noisy area for maximum benefit.

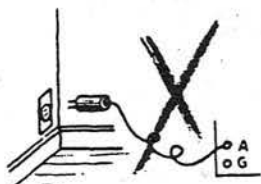
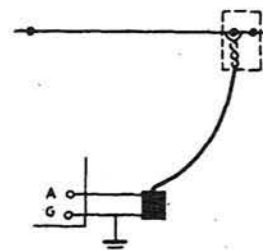
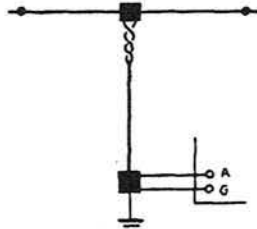
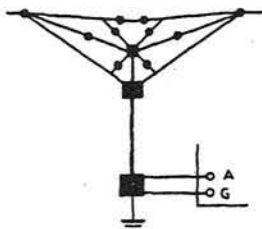
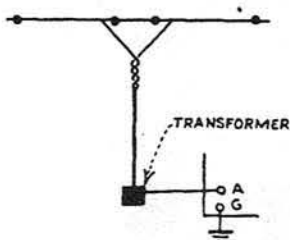


SIMPLE DOUBLET—Reduces noise pickup by download where it must pass through noisy areas. Good reception on shortwave band and satisfactory for broadcast reception. Especially efficient at certain frequencies, which may be those most often desired.

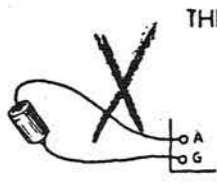
TYPICAL MODERN ALLWAVE MATCHED TYPES

Matched to reduce losses in the transmission line between the antenna proper and the set and designed, also, to give good reception over the entire broadcast and shortwave range, or in those portions of the

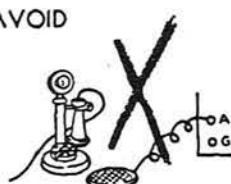
spectrum in which programs of major interest are found, these modern types and variations of them represent the last word in modern radio design.



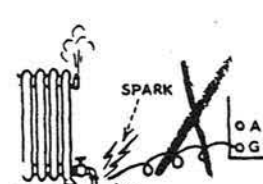
Electric Socket "Adapter"



Aerial "Eliminator"



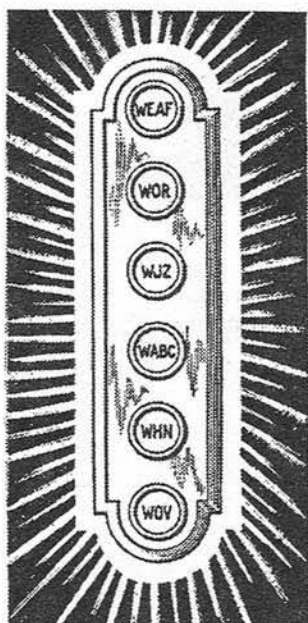
Telephone Connection



Grounding AC-DC Sets

THINGS TO AVOID

Sales Ammunition from RADIO RETAILING



THE CONSUMER WILL CHOOSE *FLASH-O-MATIC* Tuning

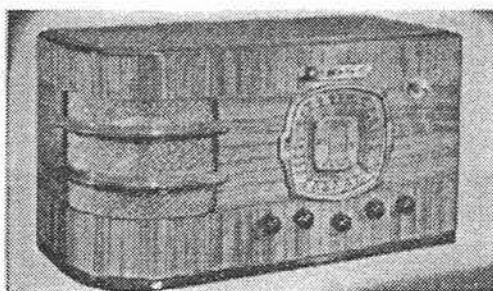
Because It Has Instantaneous Sales Appeal!

New in Design . . . Revolutionary in its simplicity . . . 6 different stations in less than a second! No complicated push-buttons . . . just a single knob that eliminates hand shifting and eye searching . . . can be operated blindfolded! That is why the radio buyer will choose the new Fada Radio with Flash-O-Matic Tuning . . . that is why Fada Radio offers the dealer "Sure-Fire" profit possibilities.

Fada offers the dealer "Stay-Sold Performance" in every price range . . . it is the radio line that has withstood the test of time.

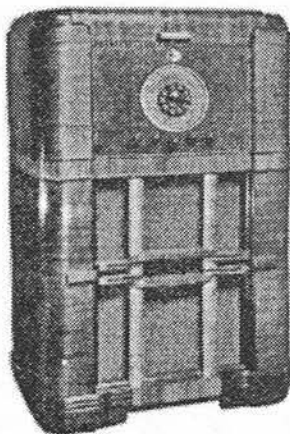


Fada Consoles feature the Flash-O-Matic 10 which tunes 10 different stations.



FADA TABLE MODELS FEATURE "FLASH-O-MATIC" TUNING

The new Fada Table Models for 1938 are featured in AC and AC-DC with Flash-O-Matic Tuning and the new Fada Golden Glo-Dial. They are unsurpassed in beauty, performance and value.



Fada Radio-Phonograph combinations feature the Flash-O-Matic 10 which tunes 10 different stations.



NEW FADA MERCHANDISER

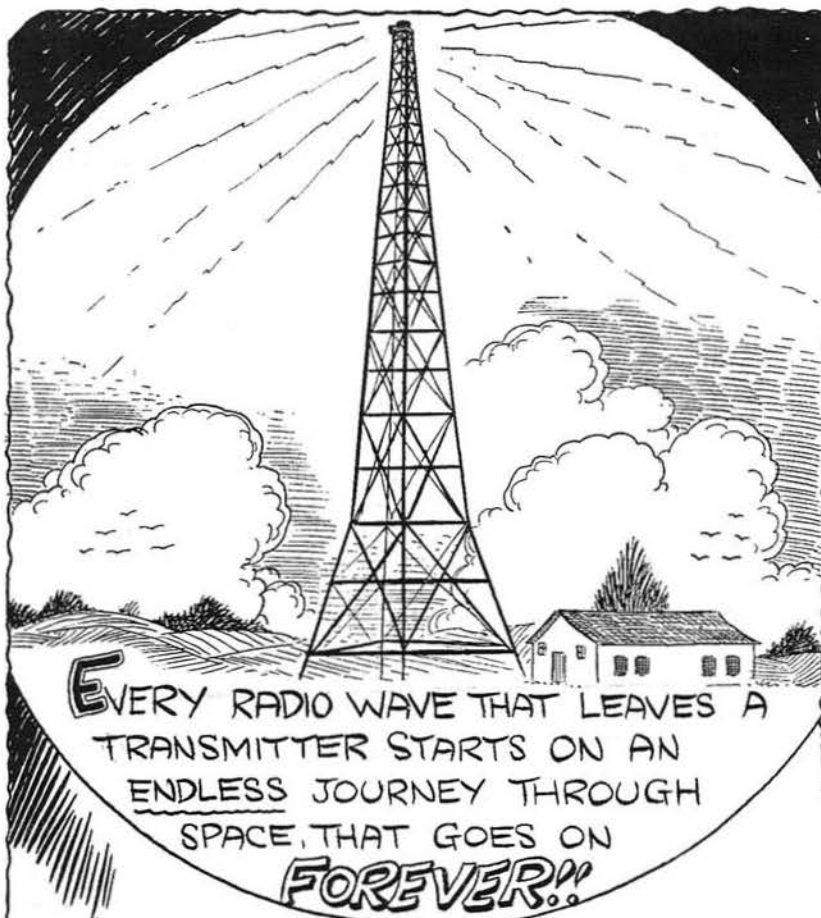
The most effective silent salesman offered to the radio dealer. One display with three separate uses. Available through Fada's co-operative advertising plan.



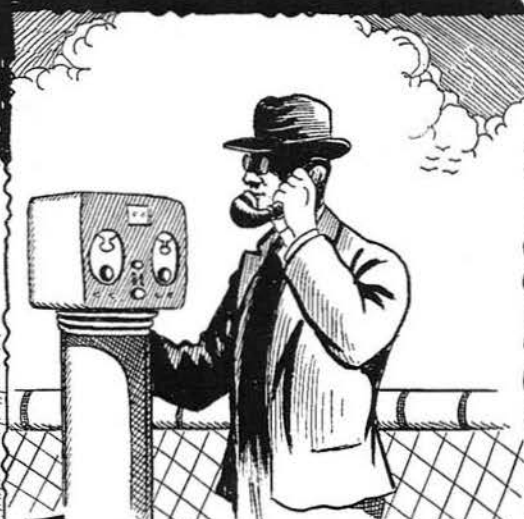
See your Fada jobber or write direct.

FADA RADIO & ELECTRIC CO., LONG ISLAND CITY, N. Y.

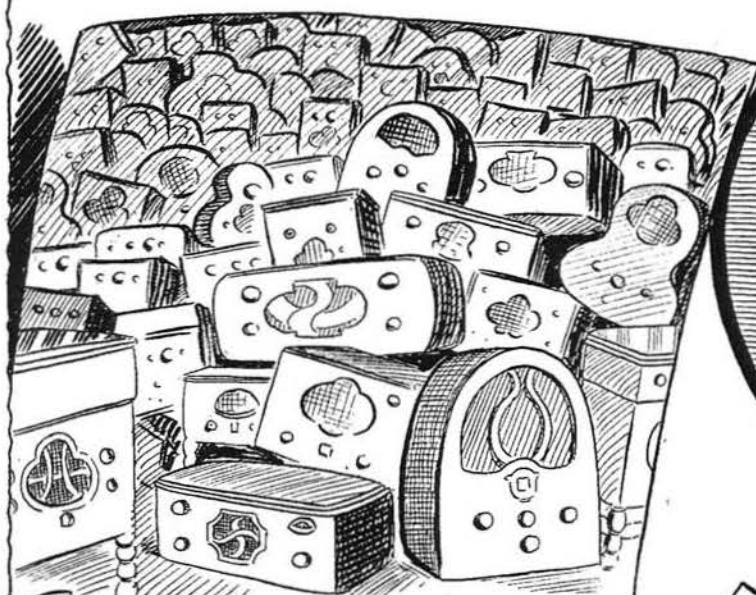
RADIO FACTS and ODDITIES



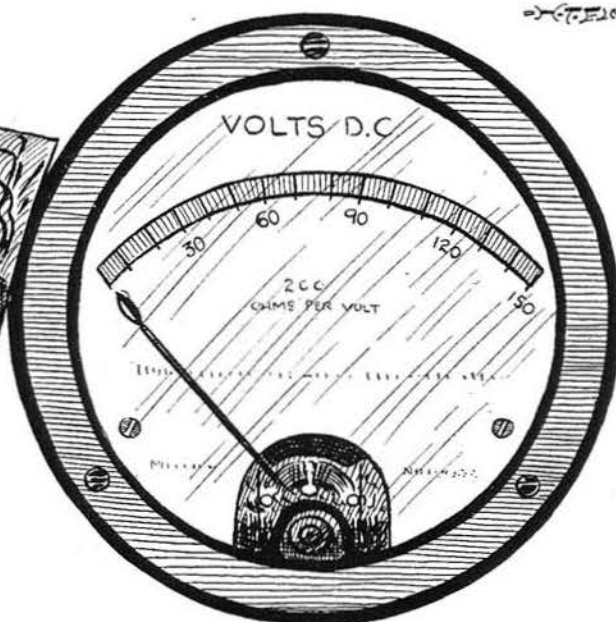
EVERY RADIO WAVE THAT LEAVES A TRANSMITTER STARTS ON AN ENDLESS JOURNEY THROUGH SPACE, THAT GOES ON FOREVER!!



THE 8 MILE SAN FRANCISCO BAY BRIDGE IS SO LARGE A CONSTRUCTION JOB THAT WORKMEN HAVE TO USE RADIO TRANSCEIVERS TO KEEP IN TOUCH WITH EACH OTHER!!!



THERE ARE MORE THAN 43,000,000 RADIO RECEIVERS IN THE WORLD!! OF THIS NUMBER, MORE THAN 18,500,000 SETS ARE IN THE UNITED STATES ALONE, WHICH EXCEEDS THE TOTAL NUMBER OF SETS IN ALL OF EUROPE!!!



A VOLTMETER DOES NOT MEASURE VOLTAGE!! WHAT IT REALLY MEASURES IS MAGNETIC PULL!!

SUBMITTED BY: EDMUND KRAMPERT, SECAUCUS, N.J.

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